MAIL STOP RCE
PATENT
0595-1003

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of

Gilles Louis ARNAUD — Conf. 6229

Application No. 10/823,582 — Group 3644

Filed April 14, 2004 — Examiner Stephen A Holzen

LIFTING SURFACE PROVIDED WITH AT LEAST ONE ROTARY FLAP

DECLARATION UNDER 37 C.F.R. §1.132

The undersigned is the inventor of the present invention and is the applicant in the present application. He hereby declares as follows:

1. He has very carefully studied the applied art, the rejections of the claims, and the present application, and has concluded that the rejection should be withdrawn because one of skill in the art would not find it obvious to optimize the variables in the manner defined in claim 1. Claims 1, 3, 5, 7-17, and 20-21 were rejected as unpatentable over PHILLIPS 6,970,773 in view of MUNOZ SAIZ 6,109,567; and claims 18-19 were rejected further in view of MILLER et al. 6,764,047.

2. Claim 1 defines a lifting surface with a flap in which the inner surface (9) and the outer surface (10) of the flap have, beyond 25% of the flap chord CO, shapes that are not

concave, in which the first trailing edge (8) of the flap has a main angle (α) included between 10° and 30°, in which the axis of rotation (4) of the flap is situated at a first distance (C1) from the first leading edge (7) that is between 15% and 35% of the chord (CO) of the flap (1), and in which the clearance (13) between the flap leading edge and the trailing edge of the lifting surface is between 1.5% and 3.5% of the chord (CO) of the flap (1).

3. The Official Action takes the position that one of skill in the art would find it obvious to optimize these dimensions because aeronautical engineers have for years modified the shape of airfoils to alter the lift and drag of airfoils and flaps.

4. In the prior art, flaps on airfoils have always been used to maximize the lift (and consequently, the drag.) Those of skill in the art have learned that when maximizing lift it is result effective to introduce a large clearance (more than 3.5% of the chord) between the flap and the trailing edge of the lifting surface. See, for example, the attached excerpt from "Aerodynamique Experimentale," (Pierre Rebuffet, 1962) in which page 453 shows a section of an aircraft wing with a flap showing a clearance much greater than 3.5% of the chord. The art does not suggest a lift benefit for a clearance between 1.5% and 3.5%

of the chord. Moreover, the present invention is mainly related to the reduction of the hinge moment of a flap attached to the lifting surface, as explained on page 1, line 10 through page 2, line 8 of the present application. An aeronautical engineer tinkering with the clearance to increase the lift would not be motivated to design a clearance between 1.5% and 3.5% of the chord because there is nothing in the art that suggests that making a clearance of this size would be result effective to increase lift or reduce hinge moment. One of skill in the art would simply not envision a clearance of 1.5% to 3.5% of the chord because the art has used much larger clearances to maximize the lift.

5. Further, aeronautical engineers would not optimize each of (a) the flap shape beyond 25% of the flap chord, and (b) the main angle of the trailing edge of the flap, and (c) the location of the axis of rotation of the flap, and (d) the clearance as claimed in claim 1. The aeronautical engineer would not find motivation in the references to modify all of these as claimed.

6. In addition, the combination of these features produces an unexpected result; namely a greatly reduced hinge moment as explained in the application as filed. There is nothing in the references that would lead an aeronautical

engineer to expect that the hinge moment would be reduced by combining these features in the manner claimed. The undersigned understands that an unexpected result provides patentability even to optimized variables that are known to be result effective, which is not believed to be the situation here.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Gilles Arnaud

Gilles Louis ARNAUD
Marseille, FRANCE

07 February 2007
Date

Attachment: Excerpt from "Aerodynamique Experimentale," (Pierre Rebuffet, 1962), page 453.

AÉRODYNAMIQUE EXPÉRIMENTALE

par

Pierre REBUFFET

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Cours professé
à l'École Nationale Supérieure de l'Aéronautique

Deuxième édition revue et augmentée
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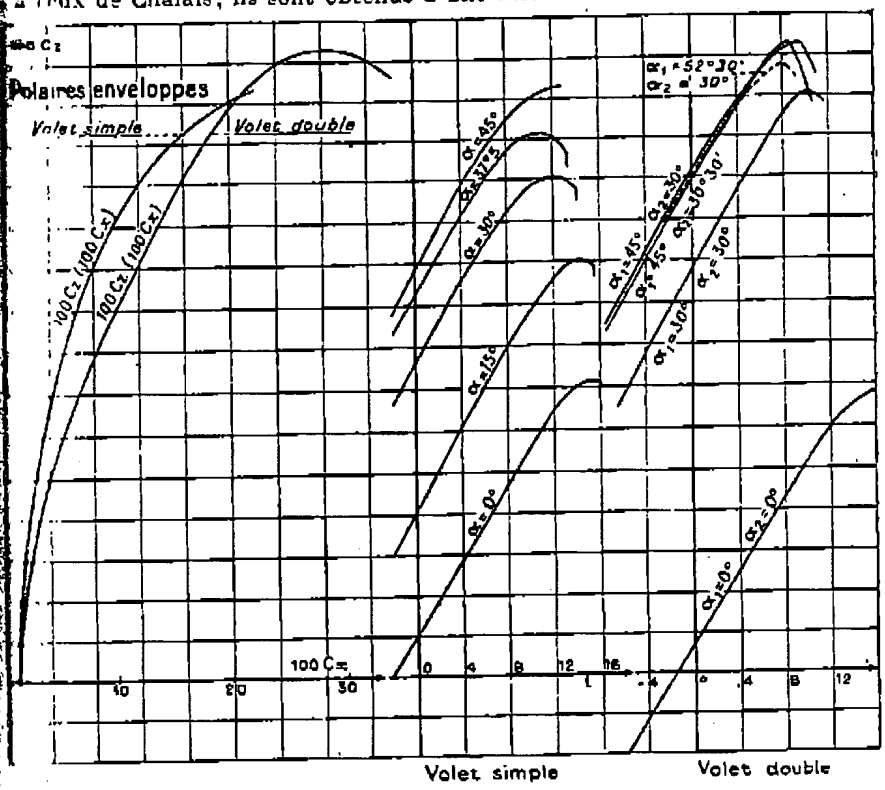
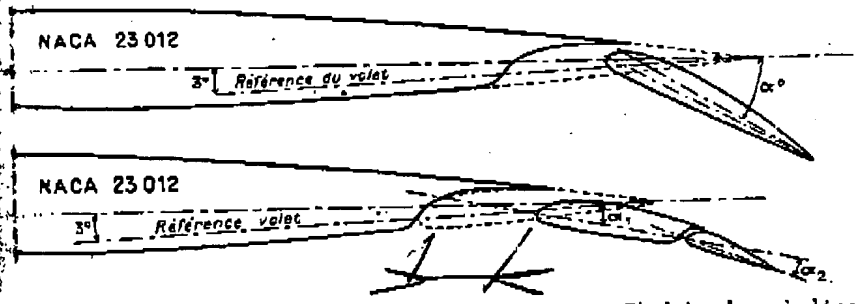
NOUVEAU TIRAGE

LIBRAIRIE POLYTECHNIQUE CH. BÉRANGER
PARIS, 15, RUE DES SAINTS-PÈRES, 15
LIÉGE, 17, BOULEVARD DE LA SAUVENIÈRE, 17

1962

Chalais, au nombre de Reynolds de 730.000. La comparaison avec Chalais établit comme suit : les C_z max. maximorum sont inférieurs de 0,2 à ceux de Chalais; ils sont obtenus à une incidence inférieure de 4°.





Le ΔC_z max. est sensiblement le même à Lille et à Chalais, donc indépendant du nombre de Reynolds quand le braquage est supérieur à 30°.